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EXAMINER	
BAND, MICHAEL A	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/823,500	STEBBINS ET AL.	
	Examiner	Art Unit	
	MICHAEL BAND	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30 and 32-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7-22,25-30 and 34-43* is/are rejected.

7)☒ Claim(s) *5-6, 23-24, and 32-33* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 32-33 are objected to because said claims are dependent upon cancelled claim 31. Therefore the claims have not been treated on the merits.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 25-26, 30, 34 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kadokura et al (US Patent No. 6,881,311).

With respect to claims 25-26, 30, and 34, Kadokura et al discloses a sputtering apparatus where fig. 7A depicts a vacuum chamber [10] with targets [110a], [110b] connected to a power supply [50] in fig. 3. Fig. 7B depicts a net-like members [75] formed of metal to serve as a particle holding means, with said net-like members [75] bolted to all interior surfaces (col. 15, lines 20-25). Kadokura et al further discloses a mesh-size of the net-like member being from 10 to 100 mesh (col. 15, lines 34-39).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-4, 7-22, 27 and are rejected under 35 U.S.C. 103(a) as being unpatentable over Sajoto et al (USPGPub 2002/0015855) in view of Konuki (JP No. 62202075).

With respect to claims 1-4, 7, 10-11, 17, 22, and 27-29, Sajoto et al discloses a system for depositing (i.e. sputtering) thin metal-oxide films and ferroelectric films by PVD (physical vapor deposition) and CVD (chemical vapor deposition) processing, with the PVD chamber used for sputter depositing (p. 2, para 0013). The invention also provides for "a system for processing substrates, comprising a vacuum chamber, a PVD chamber in communication with the vacuum chamber, and a CVD having multiple vaporized gas precursor inlets, the CVD chamber being in communication with the vacuum chamber" (p. 2, para 0014). Fig. 1 depicts a PVD chamber with a process cavity [46] with an exhaust pump [58] and chamber enclosure [2] "to establish and maintain a vacuum environment in the chamber during processing" (p. 3, para 0032). Fig. 1 further depicts a target [4] electrically connected to a power source [52] (p. 3, para 0036) with upper and lower shields [32], [40]. Fig. 3 depicts a CVD chamber with a

removable deposition chamber liner [128] adjacent to an inner wall [122], with the liner having a PID controlled heating element which maintains the liner walls at the optimum isothermal temperature (p.5, para 0049-0050). It is inherent that since the chamber liner is removable, a final coat (i.e. overcoat) of the deposition material is present upon said chamber liner. It is well known that all materials exhibit thermal properties that cause them to expand upon heating and contract upon cooling due to the laws of thermodynamics. It should be noted that the chamber liner (fig. 3, [128]) and the upper and lower shields (fig. 1, [32], [40]) have similar functions along with similar placements in their respective CVD and PVD processes. However Sajoto et al is limited in that it is not specified whether the liner is rigid or non-rigid.

Konuki teaches continuously and stably forming a thin film (i.e. CVD or PVD) by superposing a net-shaped member (i.e. flexible and soft) [25] on the inside of a vacuum tank, with the purpose of said net-shaped member [25] preventing impurities from mixing into the film (abstract). Konuki also teaches the net-shaped member [25] being composed of stainless steel. Fig. 2 depicts the net-shaped member [25] as a mat or web.

Since the prior art of Konuki recognizes the equivalency of stainless steel netting and stainless steel liner in the field of film deposition chamber liners it would have been obvious to one of ordinary skill in the art to replace chamber liner of Sajoto et al with the net-shaped member of Konuki as it is merely the selection of functionally equivalent chamber liners recognized in the art and one of ordinary skill would have a reasonable expectation of success in doing so.

With respect to claims 8-9, modified Sajoto et al further discloses that the liner comprises a ceramic material (e.g. Al_2O_3) (p. 5, para 0049), with Al_2O_3 (alumina) being a known refractory ceramic due to its well known high melting point of approximately 2054^0C as evidenced by Encyclopaedia Britannica and www.wikipedia.com (Documents U and V of PTO-892, filed 8/22/2007).

With respect to claim 12, modified Sajoto et al further discloses that the liner comprises a ceramic material (Al_2O_3) and quartz. Mineral wool is known to encompass ceramic fibers and fiberglass (i.e. quartz) as evidenced by www.wikipedia.com (Document W of PTO-892, filed 8/22/2007).

With respect to claims 13 and 16, modified Sajoto et al further depicts in fig. 3 the chamber liner [128] disposed adjacent an inner wall [122] and an interior plate [126] located directly above a substrate support member [124]. It is inherent that a substrate support member has a substrate.

With respect to claim 14, Konuki further teaches in fig. 1 the net-shaped member [25] on the ceiling of a chamber.

With respect to claims 15 and 18, modified Sajoto et al further depicts in fig. 1 a PVD chamber [1] with upper shield [40] and lower shield [32] acting as chamber liners (p. 3, para 0033-0034). A circular target [4] is seen below the top (i.e. ceiling) of the chamber. However modified Sajoto et al is limited in that only one rotary target is suggested instead of the claimed two.

It has been held that a mere duplication of parts has no patentable significance unless a new and unexpected result is produced. *In re Harza*, 274 F.2d

669, 124 USPQ 378 (CCPA 1960). Therefore it would have been obvious to one of ordinary skill in the art to place two or more targets to sputter multiple materials instead of one into the apparatus of modified Sajoto et al since sputtering multiple types of materials has no bearing on the functioning of the chamber liner as evidenced by Belkind et al (US Patent No. 5,338,422; abstract; fig. 1, [130], [150]).

With respect to claim 19, modified Sajoto et al further discloses that the target material for forming layers includes aluminum along with other materials from reactive sputtering wherein the sputtered material reacts with other materials or gases (i.e. argon, oxygen, nitrogen, etc.) to form the deposited film (p. 3, para 0032). It is well known that aluminum oxide (Al_2O_3) is classified as a ceramic material. Furthermore, modified Sajoto et al discusses ceramic materials that compose the chamber liner, specifically Al_2O_3 (p. 5, para 0049). In addition, fig. 6 depicts an oxidizer (i.e. reactive) gas passage [154] to optimally mix and deliver the oxidizer gas to a blocker plate and face plate (fig. 3, [190], [192]) and thus into the chamber as an atmospheric gas.

6. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sajoto et al (USPGPub 2002/0015855) and Konuki (JP No. 62202075) as applied to claim 17 above, and further in view of Wicker et al (USPGPub 2002/0102858).

With respect to claims 20-21, the reference is cited as discussed for claim 17. However modified Sajoto et al is limited in that while it is discussed that the chamber liner is removable and therefore requires some type of connection, said connection is not specified.

Wicker et al discusses a high density plasma processing chamber for fabrication of integrated circuits in the form of wafer (i.e. semiconductors) having a chamber liner (part 130) and a liner support [134] with the chamber liner composed of a ceramic material and the liner support composed of a flexible aluminum material (abstract; fig. 1; p. 1, para 0005; p. 2, para 0017). Depicted in fig. 1 are screws near [130], [132a] attaching the liner support which is attached to the chamber liner. It is well known that screws can be composed of aluminum and inherently have a degree of roughness exhibited in its threads and head, as evidenced by www.wikipedia.com (Document X of PTO-892, filed 8/22/2007). Surface roughness is a result effective variable, thus it is obvious to optimize as evidenced by Rath et al (US Patent No. 5,039,265; col. 8, lines 19-47). Wicker et al cites the advantage of the liner support as enabling the wall to absorb thermal stresses (abstract).

Rath et al is used as evidence to illustrate that roughness is a result effective variable known in the art. Therefore it would have been obvious to one of ordinary skill in the art to use the liner support, and therefore the screw fasteners, taught by Wicker et al to attach the removable chamber liner in modified Sajoto et al to gain the advantage of superior absorption of thermal stressing.

Since this particular parameter is recognized as a result-effective variable, i.e., a variable which achieves a recognized result, the determination of the optimum or workable ranges of said variable can be characterized as routine experimentation. See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 CCPA 1980.

It has been held that matters relating to ornamentation (i.e. fastener surface roughness) only which have no mechanical function cannot be relied upon to patentably distinguish the claimed invention from the prior art. *In re Seid*, 161 F.2d 229, 73 USPQ 431 (CCPA 1947).

7. Claims 35-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadokura et al (US Patent No. 6,881,311) as applied to claim 34 above, and further in view of Wicker et al (USPGPub 2002/0102858).

With respect to claims 35-38, Wicker et al discusses a high density plasma processing chamber for fabrication of integrated circuits in the form of wafer (i.e. semiconductors) having a chamber liner [130] and a liner support [134] with the chamber liner composed of a ceramic material and the liner support composed of a flexible aluminum material (abstract; fig. 1; p. 1, para 0005; p. 2, para 0017). Depicted in fig. 1 are screws (fig. 3A, [144]) near [130], [132a] attaching the liner support which is attached to the chamber liner. It is well known that screws are composed of aluminum and inherently have a degree of roughness exhibited in its threads and head, as evidenced by www.wikipedia.com (Document X of PTO-892, filed 8/22/2007). Wicker et al further depicts an elongated screw where the liner is sandwiched between the interior surface (i.e. wall) and fastening bar (i.e. screw head). Surface roughness is a result effective variable, thus it is obvious to optimize as evidenced by Rath et al (US Patent No. 5,039,265; col. 8, lines 19-47). Since the fastener is the aluminum and the liner is aluminum, the fastener and the liner have the same thermal expansion coefficients.

Wicker et al cites the advantage of the liner support as enabling the wall to absorb thermal stresses (abstract).

Rath et al is used as evidence to illustrate that roughness is a result effective variable known in the art. Therefore it would have been obvious to one of ordinary skill in the art to use the liner support, and therefore the screw fasteners, taught by Wicker et al to attach the removable chamber liner in Sajoto et al in order to gain the advantage of superior absorption of thermal stressing.

Since this particular parameter is recognized as a result-effective variable, i.e., a variable which achieves a recognized result, the determination of the optimum or workable ranges of said variable can be characterized as routine experimentation. See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 CCPA 1980.

It has been held that matters relating to ornamentation (i.e. fastener surface roughness) only which have no mechanical function cannot be relied upon to patentably distinguish the claimed invention from the prior art. *In re Seid*, 161 F.2d 229, 73 USPQ 431 (CCPA 1947).

8. Claims 39-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sajoto et al (USPGPub 2002/0015855) in view of Konuki (JP No. 62202075) and Wicker et al (USPGPub 2002/0102858).

With respect to claims 39-43, Sajoto et al discloses a system for depositing (i.e. sputtering) thin metal-oxide films and ferroelectric films by PVD (physical vapor deposition) and CVD (chemical vapor deposition) processing, with the PVD chamber used for sputter depositing (p. 2, para 0013). The invention also provides for "a system

for processing substrates, comprising a vacuum chamber, a PVD chamber in communication with the vacuum chamber, and a CVD having multiple vaporized gas precursor inlets, the CVD chamber being in communication with the vacuum chamber" (p. 2, para 0014). Fig. 1 depicts a PVD chamber with a process cavity [46] with an exhaust pump [58] and chamber enclosure [2] "to establish and maintain a vacuum environment in the chamber during processing" (p. 3, para 0032). Fig. 1 further depicts a target [4] electrically connected to a power source [52] (p. 3, para 0036) with upper and lower shields [32], [40]. Fig. 3 depicts a CVD chamber with a removable deposition chamber liner [128] adjacent to an inner wall [122], with the liner having a PID controlled heating element which maintains the liner walls at the optimum isothermal temperature (p.5, para 0049-0050). It is inherent that since the chamber liner is removable, a final coat (i.e. overcoat) of the deposition material is present upon said chamber liner. It is well known that all materials exhibit thermal properties that cause them to expand upon heating and contract upon cooling due to the laws of thermodynamics. It should be noted that the chamber liner (fig. 3, [128]) and the upper and lower shields (fig. 1, [32], [40]) have similar functions along with similar placements in their respective CVD and PVD processes. However Sajoto et al is limited in that it is not specified whether the liner is rigid or non-rigid.

Konuki teaches continuously and stably forming a thin film (i.e. CVD or PVD) by superposing a net-shaped member (i.e. flexible and soft) [25] on the inside of a vacuum tank, with the purpose of said net-shaped member [25] preventing impurities from mixing into the film (abstract). Konuki also teaches the net-shaped member [25] being

composed of stainless steel. Fig. 2 depicts the net-shaped member [25] as a mat or web.

Since the prior art of Konuki recognizes the equivalency of stainless steel netting and stainless steel liner in the field of film deposition chamber liners it would have been obvious to one of ordinary skill in the art to replace chamber liner of Sajoto et al with the net-shaped member of Konuki as it is merely the selection of functionally equivalent chamber liners recognized in the art and one of ordinary skill would have a reasonable expectation of success in doing so.

Wicker et al discusses a high density plasma processing chamber for fabrication of integrated circuits in the form of wafer (i.e. semiconductors) having a chamber liner (part 130) and a liner support [134] with the chamber liner composed of a ceramic material and the liner support composed of a flexible aluminum material (abstract; fig. 1; p. 1, para 0005; p. 2, para 0017). Depicted in fig. 1 are screws near [130], [132a] attaching the liner support which is attached to the chamber liner. It is well known that screws can be composed of aluminum and inherently have a degree of roughness exhibited in its threads and head, as evidenced by www.wikipedia.com (Document X of PTO-892, filed 8/22/2007). Surface roughness is a result effective variable, thus it is obvious to optimize as evidenced by Rath et al (US Patent No. 5,039,265; col. 8, lines 19-47). Wicker et al cites the advantage of the liner support as enabling the wall to absorb thermal stresses (abstract).

Rath et al is used as evidence to illustrate that roughness is a result effective variable known in the art. Therefore it would have been obvious to one of ordinary skill

in the art to use the liner support, and therefore the screw fasteners, taught by Wicker et al to attach the removable chamber liner in modified Sajoto et al to gain the advantage of superior absorption of thermal stressing.

Since this particular parameter is recognized as a result-effective variable, i.e., a variable which achieves a recognized result, the determination of the optimum or workable ranges of said variable can be characterized as routine experimentation. See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 CCPA 1980.

It has been held that matters relating to ornamentation (i.e. fastener surface roughness) only which have no mechanical function cannot be relied upon to patentably distinguish the claimed invention from the prior art. *In re Seid*, 161 F.2d 229, 73 USPQ 431 (CCPA 1947).

Allowable Subject Matter

9. Claims 5-6 and 23-24 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The allowable subject matter pertains to a sputter chamber liner comprising fibers in a randomly intertangled manner.

Response to Arguments

10. Applicant's arguments filed 2/11/2008, with respect to the rejection(s) of claim(s) 1-2, 13-14, 16-17, and 19 under 102(b) and 3-12, 15, 18, and 20-43, under 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

However, upon further consideration, a new ground(s) of rejection is made in view of Sajoto et al (2002/0015855), Konuki (JP No. 62202075), Kadokura et al (US Patent No. 6,881,311), and Wicker et al (USPGPub 2002/0102858).

11. With regards to the Applicant's arguments pertaining to Sajoto et al not teaching a removable liner for a sputtering chamber, the Examiner submits the following:

The Examiner agrees that Sajoto et al does not *explicitly* teach a removable sputter liner. However PVD and CVD reactors are known to encompass very similar characteristics, such as deposition of common materials, extreme temperature environments, and utilizing plasmas (i.e. plasma-enhanced CVD) to produce similar products such as semiconductor devices. Therefore both PVD and CVD require means for protecting the reactor's walls, such as a shield or liner. Sajoto et al is interpreted to be capable of interchanging the shield of the PVD reactor for the liner of the CVD reactor and vice versa. With respect to the shields of the PVD reactor being a permanent structure would mean the entire reactor would need to be replaced after a certain period of deposition since the shields are incapable of being removed. This seems very unreasonable. The Examiner also points to Crocker (US Patent No. 6,394,023; col. 1, lines 29-50; col. 5, lines 61-64) for teaching removable shields in both PVD and CVD reactors.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent Nos. 3,930,916; 4,414,786; 5,964,947; 5,968,379; Japanese Patent No. 11006049.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 8am-4pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

14. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1795

/PATRICK RYAN/

Supervisory Patent Examiner, Art Unit 1795